

Course Code	Course Name	Course Outcomes
14211001	Mathematics-1	CO-1. Modeling of certain physical phenomena into appropriate matrices and their transformations.
		CO- 2. Transforming line integrals, double and triple integrals into one another in solving mathematical models of some engineering applications.
		CO- 3. Students shall apply Laplace transform techniques in Transient and steady state analysis of electrical circuits, analysis of Structural engineering problems such as deflection of beams, columns etc.
		CO-4. Students are able to understand and apply Green's, Stoke's and Gauss-divergence theorems in solid mechanics, fluid mechanics, electrical engineering and various other fields.
14211002	Mathematics-2	CO-1. Students are able to understand and apply differential equations in solving Hydrodynamics, Electromagnetic fields and Fluid mechanics problems.
		CO- 2. Students are able to understand and apply Numerical Methods in solving Simultaneous equations and Transcendental equations.
		CO-3. Solving engineering problems that can be modeled as ordinary differential equations without finding general solutions.
		CO-4. Students are able to apply Fourier transform techniques to solve the Differential and Partial Differential equations that may arise in electrical circuits, analysis of Structural engineering problems such as deflection of beams, columns etc.
14221003	Engineering Physics	CO-1. The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fiber optics.
		CO-2. The important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction are focused along with ultrasonic non-destructive technique.
		CO-3. The properties and device applications of semiconducting and magnetic materials are illustrated.

		CO-4.The importance of super conducting materials and Nano-Materials along with their engineering applications is well elucidated
14231004	Engineering Chemistry	CO-1. Graduate will be able to apply the knowledge of chemistry to identifying and addressing the problems of boilers in industry.
		CO-2. Graduate will be able to appreciate the use of high polymers in engineering uses.
		CO-3. Graduate will demonstrate the knowledge of Fuels and lubricating oils in Engines.
		CO-4. Graduate will be able to appreciate the appropriate analytical methods in chemical analysis using instrumentation.
14211002	Mathematics-II	CO1: Acquire the concepts of Differential and partial differential equations
		CO2: Understand Fourier series and Fourier Transforms
		CO3: To be able to solve Numerical methods
		CO4: Apply them in solving Engineering problems where analytical methods
14211004	Engineering Chemistry	CO1: Strengthen the fundamentals of chemistry and build interface of theoretical concepts with their industrial/Engineering applications
		CO2: Learn the concepts related to water, selection of polymers, lubricants and their applications
		CO3: To learn about Energy Sources like solid, liquid and gaseous fuels
		CO4: To get the knowledge about Cement, refractories, propertoes of lubricants and handling of rocket propellants
14211005	English	CO1: Improve proficiency in English Language and fluency in expression
		CO2: To emphasise on the skills of LSRW
		CO3: To develop study skills and communication skills in formal and informal situations
		CO4: To develop good writing skills in English
14211006	Engineering Drawing	CO1: To learn fundamentals of Engineering drawings as per the International stan

		CO2: Study the principles of Projections of Points, Lines and Solids
		CO3: To know how to develop surfaces of regular solids-Prism, Cylinder, Pyramid, Cone and their sectional parts
		CO4: Apply the programming skills in academic and future Industrial projects
14211008	Engineering Workshop	CO1: Learn Trades of exercise such as Carpentry, Fitting, Sheet metal shop, House-wiring and Foundry and welding
		CO2: To gain the knowledge of Trads of demonstration like Plumbing, Machine Shop and Metal Cutting
		CO3: Study the fundamentals of digita computer
		CO4: To get acquaintance with Installation of Operating System and creation of documents using word processor, browsing of Internet
14211009	Programming in C Lab	CO1: Practice DOS and LINUX commands necessary for C Language
		CO2: Write, edit Debug, compile and execute sample C programs
		CO3: Write and execute programs to solve various mathematical programs
		CO4: To develop and execute C programs using Strings and Pointers
14211010	Engineering Sciences Lab	CO1: Study the magnetic field along the axis of coil carrying coil using Stewart-Gee's method
		CO2: Learn to use spectrometer and Torsional pendulum
		CO3: Determine the energy gap of a pn-junction
		CO4: Get exposure to tools like Analytical Balance, pH meter, Viscometer, conductometer and Bomb Calorimeter to perform experiments related to Water Analysis, Conductometric titrations, Titrimetry and study of physical properties like viscosity and calorific value of fuel
14211011	English Language and Communication Skills Lab	CO1: Develop Listening Skills
		CO2: Phonetics
		CO3: Get good Telephone skills
		CO4: Participate in debates and Group Discussions
14212101	Mathematics-3	CO1: Study about special function ns like Beta Function nd Gamma Function and their properties
		CO2: Get understanding of functions of Complex Variables
		CO3: Learn the concepts relqated to Complex Integration

		CO4: Evaluate residues by formula
14012102	Environmental Studies	CO1: Get the knowledge of various Natural Resources like Forest, Water, Mineral and Food resources
		CO2: To understand the concepts of ecosystems such as Forest, Grassland, Desert and Aquatic ecosystems
		CO3: Get understanding of Environmental Pollution and Human Pollution and their control and solid waste management
		CO4: Get awareness of social issues and Environmental Ethics
14022103	Electrical Circuits & Networks	CO1: Getting introduction to basic concepts of Electrical Circuits like types of voltage and current sources, R-L-C elements, Kirchhoff's laws, etc
		CO2: Various terminology and notations related to Single Phase AC circuits, and DC Excitation Techniques
		CO3: Steady state analysis of AC circuits using Mesh and Nodal Analysis
		CO4: Study about Series and Parallel Resonance and Locus diagrams
14022104	Electronic Devices and Circuits	CO1: Apply the knowledge of basic semiconductor material to understand advanced analog circuits
		CO2: Acquire the knowledge of various types of semiconductor diodes, characteristics and their applications
		CO3: Learn the principles of operation of BJTs and FETs
		CO4: Analyze various circuit configurations and biasing circuits of BJTs and FETs that are useful in future design applications
14022105	Signals and Systems	CO1: Get acquaintance with Frequency domain representation of different types of signals which is essential to analyze and design advanced communication systems
		CO2: Apply the Laplace transform to analyze and design continuous-time and discrete-time signals and systems
		CO3: Use the knowledge of Discrete Time Signals and Systems in digital signal processing applications
		CO4: Develop mathematical skills to solve problems involving convolution, filtering, modulation and sampling

14022106	Switching Theory and Logic Design	CO1: Learn the concepts of number systems, Boolean Algebra and K-Maps that are essential to minimize the logical functions in the design and development of digital systems
		CO2: Design and develop various combinational and sequential circuits
		CO3: Demonstrate the ability to realize Switching functions using Programmable Logic Devices
		CO4: Solve engineering problems pertaining to Digital Electronics and arrive at solutions
14022107	Basic Simulation Lab (using MATLAB)	CO1: Generate various periodic and aperiodic signals and sequences
		CO2: Perform mathematical operations using MATLAB software
		CO3: Learn how to find Convolution, Autocorrelation and Cross correlation in signal processing applications
		CO4: Use Fourier Transforms and Laplace Transforms in computing responses of LTI s for different signals and plot pole-zero maps
14022108	Electronic Devices & Circuits Lab	CO1: Gain practical knowledge of the principles of operation and characteristics of pn-diodes, Zener diodes, Photodiode and Phototransistor
		CO2: Analyze and design pn-diode Rectifier circuits
		CO3: Design BJT & FET Amplifiers and analyze their frequency response
		CO4: Demonstrate the knowledge in LED, SCR and UJT in future applications (Ex: 7 segment display using LED, SCR Control circuits and UJT relaxation oscillator, etc.)
14252201	Managerial Economics & Financial Analysis	CO1: Know what is Managerial Economics and its relation with other disciplines
		CO2: Study about theory of Production and Costing
		CO3: Getting familiarity with market and Pricing Policies
		CO4: get the knowledge of Business Organizations, New environments and costing
14022202	Principles of Electrical Engineering	CO1: Performing Transient Analysis for RL, RC Series and RLC Circuits for DC excitations

		CO2: Analyze two port networks using Admittance, Hybrid and Transmission Parameters
		CO3: Study and analysis of single Phase Transformers, OC and SC Tests, Efficiency and regulation
		CO4: Know about Constructional features of salient and non-salient pole type machines
14022203	Electronic Circuit Analysis	CO1: Study various characteristic features of BJT Amplifiers
		CO2: Design various single stage and multi-stage BJT and FET Amplifiers
		CO3: Demonstrate their knowledge in the design of Feedback amplifiers and Oscillators
		CO4: Perform analysis of various tuned amplifiers and Power Amplifiers
14022204	Pulse and Digital Circuits	CO1: Demonstrate knowledge in constructing and analyzing linear and non-linear wave shaping circuits
		CO2: Use of Logic gates and Sampling gates to develop digital systems
		CO3: Design and Develop Switching Circuits and Multivibrator Circuits
		CO4: Distinguish among various logic families and Select the appropriate one for an application
14022205	Electromagnetic Theory & Transmission Lines	CO1: Solve different problems related to Electromagnetic fields
		CO2: Analyze the boundary conditions for different mediums like Dielectric to Dielectric, Dielectric to Conductor interfaces
		CO3: Implement the Maxwell's equations in Electromagnetic field theory and analyze the various parameters and characteristics of the EM waves
		CO4: Apply knowledge for solving engineering problems related to Reflection and Refraction of plane waves
14022206	Probability Theory & Stochastic Processes	CO1: This course enables students to interpret probability by modeling sample
		CO2: They can apply various random processes like Gaussian, Exponential, Uniform and Poisson processes experimentally
		CO3: Compute PSD of Random process

		CO4: Design solutions for complex engineering problems involving random processes
14022207	Electronic Circuit Analysis Lab	CO1: Practically verify various Electronic Circuits CO2: Design and simulate (using advanced tools they will use in research and industrial applications) single stage and multi-stage BJT and FET Amplifiers CO3: Demonstrate their knowledge of design and simulation related to Feedback amplifiers and Oscillators CO4: Perform analysis of various tuned amplifiers and Power Amplifiers by design and simulation
14122208	Electrical Engineering Lab	CO1: This course provides understanding of Network Theorems and Network parameters CO2: Students can verify Kirchhoff's laws and various theorems related to electrical networks CO3: Students can learn magnetization characteristics of DC shunt motor CO4: They perform Swinburne's Test on DC motor or Generator and Break test on DC motor
14043101	Analog Communications	CO1: Get good knowledge of various Amplitude modulation and demodulation system needed in the development of any Communication System CO2: Design and apply AM and FM Transmitters, and TDM and FDM systems in analog communication Systems CO3: Demonstrate the ability to perform power and noise calculations CO4: Formulate and solve problems in analog communication systems
14043102	Linear IC Applications	CO1: Apply OP-AMPs in various IC applications CO2: Use the knowledge of DC and AC characteristics of operational amplifiers that are essential in design and simulation of analog systems. CO3: Apply multivibrator circuits using OP-AMPs and 555 timers and study the applications of Phase Locked Loops in Communication Systems.

		CO4: Design and analyze DAC, ADC or Active Analog Filter circuits in the development of Instrumentation and Control Systems
14023103	Control Systems	CO1: This course provides the knowledge of Modelling, principles and applications of Control Systems CO2: Students will be able to perform Time domain and frequency CO3: They learn stability and Root Locus criteria CO4: They get familiarity with Compensation Techniques for Linear control systems
14043104	Antenna and wave propagation	CO1: Apply the antenna basics to analyze different antennas practically CO2: Analyze different antenna Arrays, VHF, UHF and micro wave antennas. CO3: Solve engineering problems with wide range of solutions in antennas and wave propagation. CO4: Apply the knowledge of antenna measurements and wave propagation concepts in antenna design
14053112	Computer Organization	CO1: Acquire the knowledge of Digital Computer Hardware that is essential for a student of any branch of Engineering CO2: : Learn the basic concepts of various units of computer which is essential in all fields of Engineering and Science CO3: Use their knowledge in Embedded system Applications which are common for the fields "CSE" and "ECE" CO4: They can use these concepts as "Domain Knowledge" for various industrial applications
14043106	Digital IC Applications	CO1: Able to use computer-aided tools for development of complex digital logic circuits CO2: Able to model, simulate, verify, analyze and synthesize with HDL. CO3: Able to design and prototype with standard cell technology and programmable logic. CO4: Able to design tests for digital logic circuits, and design for testability

14213107	Advanced English Language Communication skills lab	<p>CO1: The course will enable the students to perform Intensive reading to improve comprehension and communication</p> <p>CO2: It provides the concepts of attentive listening</p> <p>CO3: Students get the technical writing skills that will be useful for writing their project reports, prepare their resumes and other technical reports</p> <p>CO4: They acquire the effective presentation skills that will be needed in their interviews and their jobs</p>
14043108	Pulse & Digital Circuits Lab	<ul style="list-style-type: none"> • CO1: Design and analyze non-linear wave shaping circuits like clippers and clampers and waveform generators • CO2: Design sequential and combinational circuits using logic gates and flip-flops. • CO3: Understand the switching characteristics of transistors essential in the design of switching circuits • CO4: Design and analyze multivibrators using transistors. <p>CO5: Design and analyze circuits like Schmitt Trigger, UJT relaxation oscillators, bootstrap sweep circuits and constant current sweep generator (using BJT)</p>
14043202	Microprocessors & Interfacing	<ul style="list-style-type: none"> • CO1: This course describes the Architecture and instruction set of 8085 and 8086 Microprocessors • CO2: Students get the ability to write programs and execute using 8086 Microprocessor. • CO3: They know about data transfer schemes and Interface the 8086 Microprocessor to the outside world • CO4: Design and develop Microprocessor and also Microcontroller based Systems for various applications • CO5: They acquire the knowledge of Microcontroller architecture and programming

14043203	Microwave Engineering	<ul style="list-style-type: none"> • CO1: Implement Wave guide and Microwave components for various applications. • CO2: Analyze various micro Wave Oscillators and Amplifiers • CO3: Know the significance, types and characteristics of the slow wave structures used for transmission of microwave frequencies. • CO4: Perform Microwave measurements
14043204	Digital Signal Processing	<ul style="list-style-type: none"> • CO1: Get the knowledge of discrete time signals and systems • CO2: Write algorithms for Fast Fourier Transforms • CO3: Apply Z-Transforms in digital system design • CO4: Realize Digital Filters
14043205	VLSI Design	<ul style="list-style-type: none"> • CO1: Acquire the knowledge of IC fabrication techniques used in IC foundries, where ICs are manufactured using MOS, PMOS, NMOS, CMOS & BiCMOS technologies • CO2: To calculate electrical properties of MOS circuits such as $I_{ds} - V_{ds}$ relationship, gm, figure of merit, sheet resistance, area capacitance • CO3: Design and simulate the analog/digital circuits required for a specific application, using CMOS technology • CO4: Apply appropriate testing techniques and testing tools effectively in the context of testing designed ICs
14053212	Data structures (Elective – I)	<ul style="list-style-type: none"> • CO1: Get thorough understanding of Abstract Data Types, primitive & non-primitive, and linear and non-linear data structures • CO2: Design Arrays and Linked lists • CO3: Apply Trees and Graphs • CO4: Select appropriate searching technique and sorting technique

14053213	Computer Networks (Elective – I)	<ul style="list-style-type: none"> • CO1: This course describes and distinguishes between OSI and TCP/IP reference models and introduces various types of Networks • CO2: It describes various layers of the reference models • CO3: Students get familiarity with the concepts of DNS, E-mail and multimedia • CO4: They grasp the concepts-Cryptography and Firewalls
14053214	Database Management Systems (E	<p>CO1: Draw an efficient E-R diagram, which is the basic and essential step in academic or Industrial Software project</p> <ul style="list-style-type: none"> • CO2: Apply Relational Model and SQL for the most widely used relational databases • CO3: Apply Normalization Techniques for database administration • CO5: Demonstrate the ability to perform Query Processing and Transaction Management
14043206	Communication Engineering Lab	<ul style="list-style-type: none"> • CO1: Use the knowledge of Amplitude, Frequency and Pulse Modulation Systems in developing analog Communication systems • CO2: Use the knowledge of TDM, PCM, Delta Modulation, FSK, PSK, DPSK, QPSK in developing Digital Communication systems • CO3: Perform measurements like Sensitivity, Selectivity and Fidelity of Communication subsystems and systems • CO4: Use test equipment to test various communication systems they develop
14043207	Linear and Digital IC Applications L	<ul style="list-style-type: none"> • CO1: Develop applications using OP-AMPs, PLLs and Timers • CO2: Apply active filters (LPF and HPF) in analog applications and VCO (IC 566) and Voltage Regulator (IC 723) needed in many Electronic applications • CO3: Design and simulation of Combinational and Sequential circuits using VHDL • CO4: Select and design appropriate data converters needed for analog and digital circuits

14044102	Microcontrollers & Applications	<ul style="list-style-type: none"> • CO1: Ability to understand the general organisation of the 8051, PIC and ARM microcontrollers. • CO2: Ability to design, code and debugs assembly language programs to implement simple programs. • CO3: Ability to design and implement interfacing circuits for the 8051 microcontrollers. • CO4: Use suitable interfaces for real time applications
14044103	Electronic Measurements and Instr	<ul style="list-style-type: none"> • CO1: Learn how to use Signal Generators and Wave Analyzers in analog and digital electronic applications • CO2: Get the knowledge of different types of oscilloscopes • CO3: Apply DC & AC bridges and Transducers in instrumentation for various branches of Engineering • CO4: Study the performance characteristics of instruments and measurement procedures Which are essential in developing Instrumentation systems
14044104	Optical communications	<ul style="list-style-type: none"> • CO1: Learn the Principles of Optical fibres and use Opto-electronic devices in optical fibre communication systems • CO2: Get a thorough knowledge of fibre fabrication, properties of fibres and losses in optical fibres • CO3: Learn various power launching schemes for coupling analog and digital links and WDM concepts
14044105	RADAR Systems	<ul style="list-style-type: none"> • CO1: Acquire the knowledge of different types of Radars and their operation • CO2: Get acquaintance with different devices used in Radar design • CO3: Solve problems related to different Radars • CO4: Obtain the knowledge on Navigation systems

14044106	Speech Processing (Elective)	<ul style="list-style-type: none"> • CO1: Model speech signal and applied in various applications • CO2: Use various coding techniques to compress the speech signals • CO3: Design the novel speech verification and recognition systems • CO4: Apply Speech Enhancement Techniques in the reduction of noise in speech communication system
14054112	OOPS through Java Programm	<ul style="list-style-type: none"> • CO1: Distinguish between Programming Paradigms of Conventional and Object Oriented systems • CO1: Apply the concepts of Object Oriented Programming and use them in the development of Object Oriented Systems • CO2: Use JAVA classes and packages in their academic and Industrial Software projects • CO3: Apply advanced concepts like Multithreading and Applets
14044107	Embedded Real Time Operating Sy	<ul style="list-style-type: none"> • CO1: Demonstrate the to develop Embedded sytems for Engineering, Medicine, business and home applications • CO2: Use Microcontrollers and Electronic design and automation (EDA) tools • CO3: Select appropriate Operating System and type size of Memory required based on the application • CO4: Use communication buses for device networks (serial and parallel) and Program modelling concepts like DFG modeling and UML modelling

14054108	Neural networks and Fuzzy Logic (E)	<ul style="list-style-type: none"> • CO1: Gain the knowledge of Artificial Neural Networks based on neurons • CO2: Work with Counter Propagation Networks and Rrecurrent Networks and Bidirectional Associative Memory (BAM) • CO3: Apply fuzzy systems, fuzzy relations and fuzzy measures • CO4: Get familiarity with fuzzy associative memories (FAM) and applications of ANN
14044108	Data Communications (Elective)	<ul style="list-style-type: none"> • CO1: This course gives the basic concepts of data communications and networking • CO2: Students learn digital multiplexing techniques and hierarchy • CO3: They familiarize with wireless communications and cellular mobile systems • CO4: They get the idea of telephone instruments and telephone circuits
14044109	Microwave & Optical Communicat	<ul style="list-style-type: none"> • CO1: Measure radiation pattern of antennas and VSWR, attenuation and losses in microwave circuits they design • CO2: Design applications using microwave waveguides and components • CO3: Design simple fibre optic communication system • CO4: Measure the losses in fibre optic communication system they design

14044110	Microprocessors & DSP lab	<ul style="list-style-type: none"> • CO1: Write assembly language programs to perform various arithmetic and logical operations using 8086 Microprocessors. • CO2: Interface 8259-Interrupt controller and 8279-keyboard display with the 8086 microprocessor. • CO3: Acquire An in-depth knowledge of applying the concepts on real- time applications. • CO4: Verify linear and circular convolutions using DSP processors (TMS320C6748).
14044201	Cellular & Mobile Communications	<ul style="list-style-type: none"> • CO1:Design Cellular and Mobile Radio Systems and study their performance • CO2: Take care of co-channel interference non co-channel interference in the systems they are going to develop • CO3: Apply the concepts of Frequency Management and Channel Assignment and handoffs • CO4: Learn and use the concepts of 'Cell coverage for signal and traffic' and their effects over different terrains
14044202	Digital Image Processing	<ul style="list-style-type: none"> • CO1: Get broad exposure to various applications of image processing in industry, medicine, and defence • CO2: Learn Various transforms used in Image Processing • CO3: Learn and use techniques/Algorithms for Image Enhancement, Compression, Segmentation and Image restoration • CO4: Apply the concepts of Digital Image Processing in academic and research projects

14044203	Satellite Communications	<ul style="list-style-type: none"> • CO1: Apply the concepts of Satellite Communication in space research • CO2: Use the knowledge of Orbital aspects involved in space communication applications • CO3: Design satellite link and space craft • CO4: Learn the concepts of multiple access such as FDMA, TDMA, CDMA, etc. and use them in the development of mobile communication systems
14044204	Data acquisition systems	<ul style="list-style-type: none"> • CO1: To apply the knowledge of various amplifiers and filters in pre-processing systems used in data acquisition systems. • CO2: To select appropriate recording system (recorders and plotters) for a given data acquisition systems • CO3: Apply their knowledge in remote data acquisition • CO4: Enrich the knowledge of display systems
14044205	Spread Spectrum Communications	<ul style="list-style-type: none"> • CO1: Analyze the performance of spreading code acquisition and tracking circuits. • CO2: Describe the differences and benefits of different types of spreading codes. • CO3: Analyze the performance of spread spectrum systems in the presence of interference. • CO4: Select the major factors influencing the capacity of CDMA wireless networks

14044206	Biomedical Instrumentation	<ul style="list-style-type: none"> • CO1: Gain the knowledge of Components of Medical Instrumentation System and characteristics of Bio-medical instruments • CO2: Get acquaintance with the concepts of blood pressure and blood flow measurement • CO3: Apply their knowledge in using ECG, EEG and EMG in research applications • CO4: Know the internal functionality of pacemakers and defibrillators used in cardiac instrumentation
14044207	Seminar	<ul style="list-style-type: none"> • CO1: Perform 'Literature survey' (using text books and Internet) on the selected topic, which is the most important step in Research Methodology • CO2: Effective preparation and presentation of PPT • CO3: Improve their verbal Communication skills and confidence for their career development • CO4: 'Summary report' preparation and organization which are the most important features in using Technical English
14044208	Project Work	<ul style="list-style-type: none"> • CO1: Learn and apply the concepts of research methodology • CO2: Work efficiently in their future academic and industrial projects • CO3: Improving the art of organization of ideas and presentation before audience • CO4: Share the knowledge through team work, and use of Internet to study the latest developments in the area they work